

REMARKS

Claims 1-3, 6, 7 and 17 were addressed in the subject office action. In addition, the office action set forth objections to various drawings and to the specification. The claims stand rejected under 35 U.S.C. 102 and 103.

Objections to the Drawings

Figure 4 is objected to due to the lack of reference signs mentioned in the description for "transformer 43", "drain source circuit 45" and "MOSFET 38". The enclosed replacement sheet for Figure 4 includes the missing reference numerals.

Figures 5A-D are objected to because they do not include the reference numeral for "train 52". This objection is respectfully traversed since the identified portion of the description clearly indicates that train 52 appears in Figure 6D.

Figure 5 is objected to as containing a reference number not mentioned in the description. The Examiner is respectfully directed to page 9, line 11, where the numeral 54 is used to indicate an average value of the voltage depicted in the Figure.

Figure 4 is objected to as containing a reference number "40" not mentioned in the description. In response, Figure 4 has been amended to conform to the description by changing reference number "40" to "38" as set forth at page 8, line 5 of the specification.

Figures 5A-D and 6A-D are objected to on the grounds that the legends of the X-axis are illegible. These Figures have been amended for legibility.

Figures 6B-D are objected to because they allegedly do not show any pulse. The Examiner is respectfully advised that Figures 6B-D depict the same pulses shown in Figures 5B-D, except that the horizontal time scale is different. Given the difference in time scale, the pulses shown in Figures 5B-D can only be depicted as virtual vertical spikes in Figures 6B-D, as shown.

Objection to the Specification

The Examiner has noted an inadvertent error in the reference to the figures at page 9, line 18, in the specification. The amendments to the specification adopt the recommended correction.

Rejection of Claims

Claims 1-3, 6, 7 and 17 stood rejected under 35 U.S.C. 102 as being anticipated by or, in the alternative, under 35 U.S.C. 103 as being obvious over, U.S. Patent 4,038,165 to Lowther ("the Lowther Patent").

In response, the Applicant submits herewith a substitute set of claims 20-34 that provide a patentable distinction over the Lowther Patent.

The claimed invention is now defined as a method for producing ozone by flowing oxygen through an electrode region and changing the electric field in the electrode region at a rate faster than 3kV/mm/10ns (claim 20), and as an apparatus for producing ozone that includes voltage pulse generating means to vary an electric field in an electrode region at the rate specified in the stated method (claim 23).

By specifying in the independent claims that method and apparatus cause a change in the electric field in the electrode region at a rate faster than 3kV/mm/10ns, the Applicant has provided a patentable distinction over the Lowther Patent. Although the Lowther Patent discloses a device that may be used for the production of ozone and in which a varying electric field is produced, the rate of change of the field is less than that stated in the claims of this application. The Lowther Patent does not expressly discuss the rate of change of the electric field described therein but, as shown in the accompanying Declaration, a person of ordinary skill in the art, upon reading the Lowther Patent, would realize that the rate of change in the electric field generated by the process and apparatus described therein is not as great as what is set forth in the claims now submitted in the captioned application. In the accompanying Declaration, the rate of change of the electric field is determined to be 2.9kV/mm/10ns, based on the disclosure of the Lowther Patent starting at column 4, line 36 through column 6, line 30. Part of the derivation requires that the strength of the electric field be calculated as $E = V_s/T_g$, (see the accompanying Declaration, paragraph 3.c.) wherein V_s equals the sparking gap voltage and T_g is the discharge gap. Dividing this by the rise time of the voltage pulse as discussed in Declaration paragraph 3.f., the rate of change of the electric field of the Lowther Patent apparatus is determined. It should further be noted that the selected voltage V_s is significantly in excess of the range of gap voltages more broadly described by the Lowther Patent, which is only about 10 to 5,000 volts (see column 9, lines 52-54 and column 10, lines 38-40). With normally lesser values for V_s , the rate of change for the Lowther Patent will be even less than what was calculated in Declaration paragraph 3.f., so it is clear that the method and apparatus of the Lowther Patent will not achieve the rate of change of the claimed invention.

The Applicant notes that in the office action, the Examiner has asserted that Lowther discloses a gap voltage in the range of 500 to 30,000 volts per cm, referring to column 12, lines 60-63. The Declarant respectfully points out in Declaration paragraph 3.b. that the voltage in the cited passage does not refer to the spark gap. It is further noted that in that passage the Lowther Patent is referring to the generation of charged particles using electrostatic paint spraying or electrostatic precipitation devices, not to the device disclosed by the Lowther Patent and not to the generation of ozone.

As noted in paragraph 3.i. of the accompanying Declaration, it is believed that as a result of producing ozone in accordance with the pending claims, i.e., by generating an electric field that changes at a rate faster than 3kV/mm/10ns, substantial improvements in efficiency are realized due to the spontaneous ionization of oxygen, whereas the Lowther Patent apparatus leads to electron collision ionization.

In view of the foregoing comments, it should now be clear that new claims 20-33 all define a patentable distinction relative to the Lowther Patent.

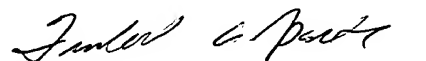
New claim 34 also defines an apparatus for producing ozone that comprises a novel voltage pulse generating means. The claimed voltage pulse generating means is novel in that it comprises a switched field effect transistor in combination with a switch circuit and a charge storage device. As disclosed in the application, an apparatus as defined in claim 34 can be adapted to yield improved rise times of a voltage pulse in the output circuit, thereby permitting the device to generate an electric field that changes at a rate faster than was employed in the prior art. However, since the voltage pulse generating means as defined in claim 34 constitutes a novel arrangement of elements, the apparatus need not be limited to the generation of an electric field that changes at any particular rate. Accordingly, the rate limitation of claims 20 and 23 does not appear in claim 34.

Reexamination and reconsideration of the application in view of the foregoing amendments and remarks is respectfully requested.

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Respectfully submitted,



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